

DETAILED ACTION

Election/Restrictions

1. The examiner has mistakenly used U.S. restriction practice on the restriction requirement mailed on 06/30/2009 for the instant 371 application. However, as far as the species election requirement, in similar manner as described in the restriction requirement mailed on 06/30/09, species A-F are not so linked as to form a single general inventive concept. Answers to argument with traverse, as well as correction to requirement of Election/Restrictions of species of 371 are detailed as follow:
2. This application contains claims directed to more than one species of the generic invention. These species are deemed to lack unity of invention because they are not so linked as to form a single general inventive concept under PCT Rule 13.1.

The species are as follows:

A) - claims 19-20 & 23, wherein the image recording device and the image processing device are configured so that, immediately before the transfer of the droplet, a meniscus height or a shape of the droplet can be determined.

B) - claim 22, wherein the image recording device and the image processing device are configured so that, the distance of the end of the capillary tube or the needle to the substrate or the distance of the droplet to the substrate can be detected.

C) - claim 24, wherein the image recording device and the image processing device are configured so that, a point in time of the transfer of the droplet can be detected by determining a detected characteristic surface which changes at the time of the transfer.

D) - claims 25&26, wherein the image recording device and the image processing device are configured so that, before the transfer, a first surface defined by at least a part of the droplet can be detected, and at the time of or after the transfer, a second surface defined by at least the part of the droplet and a mirror image of the droplet can be detected.

E) - claim 27, wherein the image recording device and the image processing device are configured so that, a change in a width of the droplet or of a meniscus, beyond a threshold value, can be detected at the time of the transfer.

F) - claim 28, wherein the image recording device and the image processing device are configured in such a way that a change in a surface in a work window beyond a threshold value, can be detected at the time of the transfer.

Applicant is required, in reply to this action, to elect a single species to which the claims shall be restricted if no generic claim is finally held to be allowable. The reply must also identify the claims readable on the elected species, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered non-responsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

The following claim(s) are generic: claims 18, 21, 29-35.

3. The species listed above do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, the species lack the same or corresponding special technical features for the following reasons: as described in the applicants' claims 19-20 and 22-28, the image recording device and the image processing device of each one of the species group is differently configured from the image recording device and the image processing device of the other group of species, as such claims 19-35 are not linked to form a single general inventive concept.

4. The special technical feature (STF) is a device for applying medium to a substrate having multiple configurations of the image recording device and the image processing device. The STF is shown in the IDS to Maiorca et al (US 5,052,338) or Cleveland et al (US 5,324,359), for example. There can be no Unity of invention when the STF of Single inventive concept is shown in the prior art. Hence lack of Unity is held by the examiner under 37 CFR 1.475 and PCT rule 13.

5. Applicant's election with traverse of species A in the reply filed on 07/30/2009 is acknowledged. The traversal is on the ground(s) that the restriction/election action fails to establish lack of unity of invention, missing one common special technical feature is shared among all of the claims and all of dependent claims 19-35 depends from a single independent claim 18. This is not found persuasive because as described above claims 19-35 are not linked to form a single general inventive concept as such the application contains claims directed to more than one species of the generic invention, see also the restriction/election under US 371 above for more explanation.

The requirement is still deemed proper and is therefore made FINAL.

6. Claims 22, 24-28 and 36 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected inventions, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 07/30/2009.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 19-20, 21, 23 29, 31, 32 and 35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claims 19-20 and 23, lines 1-2 each; the phrase "the image recording device and the image processing device" lacks proper antecedent basis. For the purpose of examination the phrase "the at least one image recording device and the at least one image processing device" is assumed. In claims 21, 29, 31-32 and 35 each, line 1; the phrase "the image recording device " lacks proper antecedent basis. For the purpose of examination the phrase "the at least one image recording device "is assumed.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 18 and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by Maiorca et al (US 5,052,338).

Maiorca et al discloses (see Fig 4 and Abstract) a device for applying or dispensing a fluid medium to a substrate comprising a capillary tube or a needle (14) having an end (14a); a first arrangement (valving device; see column 4, lines 29-37) configured to cause the fluid medium to exit from the end of the capillary tube in a form of droplet or to adhere to the end of the needle in a form of a droplet; a second arrangement (carriage 10) configured to vary a distance of the end of the capillary tube or the needle to the substrate; and at least one image recording device (camera 12) and at least one image processing device (microcontroller, see column 7, lines 3-17) assigned to the at least one image recording device, a time of transfer of the droplet, from the capillary tube or the needle to the substrate capable of being detected by the at least one image recording device when the distance of the end of the needle to the substrate is reduced (predetermined value).

With respect to claim 21, Maiorca et al discloses at least on image recording device including at least one of a camera.

11. Claims 18-21, 23 and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by Cleveland et al (US 5,324,359).

As to claims 18 and 33, Cleveland et al discloses (see Figs 1-2 and 5) a device for applying or dispensing a fluid medium to a substrate comprising a capillary tube or a needle (nozzle with outlet 19) having an end (see Fig 2); a first arrangement (valving means 17; Fig 2) configured to cause the fluid medium to exit from the end of the capillary tube in a form of droplet or to adhere to the end of the needle in a form of a droplet; a second arrangement (movable support means 26) configured to vary a distance of the end of the capillary tube or the needle to the substrate; and at least one image recording device (vision system 39) and at least one image processing device (microprocessor 37, see Fig 4) assigned to the at least one image recording device, a time of transfer of the droplet, from the capillary tube or the needle to the substrate capable of being detected by the at least one image recording device when the distance of the end of the needle to the substrate is reduced.

As to claims 19-20 and 23, in Cleveland et al the image recording device and the image processing device is configured so that, immediately before the transfer of the droplet the shape of the droplet can be determined (see Fig 5), or the image recording and processing device is capable of performing so that a point in time when the droplet is transferred can be detected with the aid of a differential image method or by monitoring the shape change of the droplet when the droplet is transferred .

With respect to claim 21, Cleveland et al discloses at least one image recording device including at least one of a light barrier (light and vision system; see Fig 5).

12. Claims 18 and 33-34 rejected under 35 U.S.C. 102(a) as being anticipated by Schucker (WO 0226397A1; see US 7,112,246 for a complete translation).

Schucker et al discloses (see Figs 1-3) a device for applying or dispensing a fluid medium to a substrate comprising a capillary tube or a needle (needle 22 with nozzle 24) having an end (see Fig 2); a first arrangement (piston 48 actuating valve needle 22) configured to cause the fluid medium to exit from the end of the capillary tube in a form of droplet or to adhere to the end of the needle in a form of a droplet; a second arrangement (robot 16) configured to vary a distance of the end of the capillary tube or the needle to the substrate; and at least one image recording device (camera 42) and at least one image processing device (49, see Fig 3) assigned to the at least one image recording device, a time of transfer of the droplet, from the capillary tube or the needle to the substrate capable of being detected by the at least one image recording device when the distance of the end of the needle to the substrate is reduced.

13. Claims 18, 30 and 33 rejected under 35 U.S.C. 102(b) as being anticipated by Ishida et al (US 5,614,024).

As to claims 18 and 33, Ishida et al discloses (see Fig 1) a device for applying a fluid medium to a substrate comprising a capillary tube or a needle (nozzle 1) having an end; a first arrangement (syringe type cylinder 2) configured to cause the fluid medium to exit from the end of the capillary tube in a form of droplet or to adhere to the end of the needle in a form of a droplet; a second arrangement (z-axis table 4a) configured to vary a distance of the end of the capillary tube or the needle to the substrate; and at

least one image recording device (camera 11a) and at least one image processing device (control unit 14) assigned to the at least one image recording device, a time of transfer of the droplet, from the capillary tube or the needle to the substrate capable of being detected by the at least one image recording device when the distance of the end of the needle to the substrate is reduced.

Regarding claim 30, Ishida et al discloses a reference marker (supporting member 12) connected to the tube or the needle (2).

14. Claims 18, 31 and 33 rejected under 35 U.S.C. 102(b) as being anticipated by Subramanian et al (US 6,270,579).

Subramanian et al discloses (see Fig 1) a device for applying or dispensing a fluid medium to a substrate comprising a capillary tube or a needle (nozzle 40) having an end; a first arrangement (volume control system 74) configured to cause the fluid medium to exit from the end of the capillary tube in a form of droplet or to adhere to the end of the needle in a form of a droplet; a second arrangement (multiple axis movement system 80) configured to vary a distance of the end of the capillary tube or the needle to the substrate; and at least one image recording device (light receiver 70 including fiber optic connections) and at least one image processing device (processor 64) assigned to the at least one image recording device, a time of transfer of the droplet, from the capillary tube or the needle to the substrate capable of being detected by the at least one image recording device when the distance of the end of the needle to the substrate is reduced.

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

17. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maiorca or Cleveland et al or Ishida et al or Schucker or Subramanian et al as applied to claim 18 above and further in view of Martel (US 5,922,132).

Maiorca or Cleveland et al or Ishida et al or Schucker or Subramanian et al discloses one of the image recording devices such as a camera, a light barrier and a fiber-optic sensor(see above). However, the use of sound detecting arrangement is equivalent structure known in the art; such as taught by Martel (see column 2, lines22-31).

Therefore, because these detecting means were art-recognized equivalents at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute a camera or a light barrier or optical sensor for a sound detecting arrangement.

18. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maiorca or Cleveland et al or Ishida et al or Schucker as applied to claim 18 above and further in view of Chang et al (US 2004/0105001A1) and Ulrichsen et al (US 6,914,678).

Maiorca or Cleveland et al or Ishida et al or Schucker lacks teaching a camera having an associated rotatable mirror system. Chang et al discloses (see Fig 9) a camera having an associated mirror (38) for detecting a surface. Ulrichsen et al also discloses a rotatable mirror (19) associated with an image recording device or camera (22, 4) in detecting or inspecting a stream of matters (see Fig 12). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a mirror in Maiorca or Cleveland et al or Ishida et al or Schucker to assist the camera and the light for small angle as taught by Chang et al (see paragraph 66). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a rotatable mirror so the entire surface of a substrate is scanned by the beam of light as taught by Ulrichsen et al (see column 5, lines 27-30).

19. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maiorca or Cleveland et al or Ishida et al or Schucker as applied to claim 18 above and further in view of Chang et al (US 2004/0105001A1).

Maiorca or Cleveland et al or Ishida et al or Schucker lacks teaching a camera having a telecentric lens. However, Chang et al discloses (see paragraphs 56-57) a camera having a telecentric lens 14'. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a telecentric lens in the camera of Maiorca or Cleveland et al or Ishida et al or Schucker to improve the viewing angle as taught by Chang et al.

Allowable Subject Matter

20. Claim 32 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

21. The following is a statement of reasons for the indication of allowable subject matter: It is known to use a plurality of cameras, such as taught by Tella et al (see paragraph 48). However, prior art of record does not disclose or suggest the combination of a rotatable mirror system with an image recording device having two cameras which detects the droplet immediately before the transfer and detects the droplet at the time of the transfer at different angles to the substrate in a device for applying a fluid medium to a substrate comprising elements as claimed in claim 18.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YEWEBDAR T. TADESSE whose telephone number is (571)272-1238. The examiner can normally be reached on Monday-Friday 8:00 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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